REMARKS

Favorable consideration of this Application as presently amended and in light of the following discussion is respectfully requested.

After entry of the foregoing Amendment, Claims 1-5, 7-15, and 17-20 are pending in the present Application. Claims 6 and 16 have been cancelled without prejudice or disclaimer. Claims 1 and 11 have been amended to incorporate cancelled subject matter. No new matter has been added.

By way of summary, the Official Action presents the following issues: Claims 1, 2, 4-9, 11, 12, and 14-19 stand rejected under 35 U.S.C. § 103 as being unpatentable over Morishima (EP 0795845) in view of Lindgren (WO 99/65221), and further in view of Pearson (U.S. Patent No. 5,400,434); Claims 3 and 13 stand rejected under 35 U.S.C. §103 as being unpatentable over Morishima in view of Lindgren, further in view of Pearson, and yet further in view of Malah ("Cepstral Residual Vocoder for Improved Quality Speech Transmission at 4.8 kbps," 1982); and Claims 10 and 20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Morishima in view of Lindgren, further in view of Pearson and yet further in view of Dunlap et al. (U.S. Patent No. 5,748,534, hereinafter "Dunlap").

REJECTION UNDER 35 U.S.C. § 103

The outstanding Official Action has rejected Claims 1, 2, 4-9, 11, 12, and 14-19 under 35 U.S.C. § 103 as being unpatentable over Morishima in view of Lindgren, and further in view of Pearson. The Official Action states that Morishima discloses all of the Applicant's claim limitations, with the exception of generating musical notes by digitally sampling a frequency distribution and altering the pitch of stored audio waveform samples. However, the Official Action cites Lindgren and Pearson as disclosing this more detailed aspect of the

Applicant's invention, and states that it would have been obvious to one skilled in the art at the time the invention was made to combine the cited references for arriving at the Applicant's claims. Applicant respectfully traverses the rejection.

Applicant's amended Claim 1 recites, *inter alia*, a sound generating device for a mobile terminal, including:

> . . . calculating means for calculating, on the basis of a preset calculation rule, a single sound table from the samples of the stored waveform which corresponds to the selected sound by calculating additional samples in between respective adjacent samples of said waveform a number of additional samples being the same for each note of an octave, but decreasing with ascending octaves;
>
> reading means for reading out a number of the samples, but not all of the samples from said calculated sound table, wherein the number of said samples read out varies depending on said selected pitch for said selected sound . . .

Morishima describes a radio paging receiver, including a scale map ROM (7) for memorizing a plurality of musical tone information, a CPU (5) for controlling operation of the paging device, and appropriate amplification and decoding circuitry.[1]

Lindgren describes a mobile telecommunication device with an acoustically programmable ring tone generating circuit (230), the ring tone generating circuit to extract a set of tone-related digital parameters related to the frequency and duration of respective tones in the acoustical signal.[2]

Pearson describes a system in which the pitch of a digitally stored sound waveform is changed by calculating additional interpolation samples between adjacent waveform samples. For example, to produce a frequency 1-half that of the original, interpolated points (119) are added between each of the existing points (115) in a table, as shown in Fig. 12. Since the output sample rate remains at 10 kHz, the additional samples effectively stretch out the

[1] Morishima at column 4, line 19 through column 5, line 15.
[2] Lindgren at pages 6-7.

signal, in this case doubling the period and halving the frequency as shown by waveform (121) in Fig. 13.[3] In other words, in order to lower the pitch, additional interpolation samples are calculated. Since the output sample rate remains the same (10 kHz), the frequency, and, therefore, the pitch, is lowered.

As noted in the previous response, Pearson maintains a constant audio output rate as noted in column 7 lines 2-3. In the Official Action of July 7, 2006, it was noted that certain features of the Applicant's arguments were not recited in the outstanding claims. Applicant acknowledges that such features are not recited in the claims and respectfully submit that this point was noted in the previous response to simply identify a limitation of the Pearson design with respect to the claimed invention. In other words, as noted in column 7 lines 11-18 of Pearson, pitch variability is limited to a small range adjacent and below the pitch of the sample to avoid aliasing and unatural sound caused by a lower pitch.

Conversely, in an exemplary embodiment of the Applicant's claimed advancement, as recited in amended Claim 1, a sound generating device is provided, in which a single sound table is calculated on the basis of a preset calculation rule. The sound table is populated from samples of a stored waveform corresponding to a selected sound, by calculating additional samples in between respective adjacent samples of the waveform. A number of the additional samples is the same for each note of an octave, but decreases with ascending octaves. Neither Pearson alone or in combination with Lindgren or Morishima disclose or suggest the calculation of samples for populating a single sound table, the number of which being dependent upon whether the samples correspond to same note octave or an ascending octave. Moreover, as Pearson does not deal with the musical sound but instead speech data, it does not address "notes" or octaves of an audio waveform. Indeed, Pearson's discussion of

[3] Pearson at column 6, line 67 through column 7, line 6.

multiple tables in effect teaches away from Applicant's optimized samples. For example, as noted in page 5 of the specification:

> For the first octave c-h (262-494 Hz), the number of interpolated values per sample is 47, so that a total of (48x51 =) 2048 samples are comprised in each respectively calculated sound table. For the second octave c'-h' (524-988 Hz), 23 values are interpolated per sample, so that a total (24x51 =) 1224 samples are comprised in each calculated sound table. For the third octave c''-h'' (1048-1976 Hz), 11 values are interpolated between two adjacent samples, so that a total of (12x51) 612 samples are comprised in each calculated sound table. For the third octave c'''-h''' (2096-3952 Hz), 5 values are interpolated between two adjacent samples, so that a total of (6x51 =) 306 samples are comprised in each calculated sound table. The number of interpolated values between two adjacent samples for each octave is about half of the value of the number of interpolated samples between two adjacent samples for the preceding octave. It is to be noted that higher pitches require a lower number of samples for a sound table due to the 4 kHz limitation (end of the fourth octave), so that memory space and processing power can be reduced in the higher frequency range. (emphasis added)

As Applicant's sound generating device is provided for a mobile terminal, Applicant submits that the use of the multiple memory tables is a teaching away from an Applicant's simplified structure for use in the mobile terminals having limited processing and memory resources. "A reference may be said to teach away when a person of ordinary skill in the art, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 31 U.S.P.Q.2d 1130, 1131 (Fed. Cir. 1994). To this end, "disclosures in the references that diverge from and teach away from the invention cannot be disregarded", Phillips Petroleum Company v. U.S. Steel Corp., 9 U.S.P.Q.2d 1461 (Fed. Cir. 1989).

Accordingly, Applicant respectfully requests that the rejection of Claims 1, 2, 4-9, 11, 12, and 14-19 under 35 U.S.C. § 103 be withdrawn.

The outstanding Official Action has rejected Claims 3, 10, 13, and 20 under 35 U.S.C. §103 as being unpatentable over Morishima in view of Lindgren, in view of Pearson, and further in view of Malah. The Official Action states that Morishima discloses all of the Applicant's claim limitations with the exception of generating musical notes by digitally sampling a frequency distribution, altering the pitch of a sound waveform, or utilizing 51 samples for a note waveform. The Official Action cites Lindgren, Pearson, and Malah as describing these more detailed aspects of the Applicant's invention, and states that it would have been obvious to one skilled in the art at the time the invention was made to combine the cited references for arriving at the Applicant's claims. Applicant respectfully traverses the rejection.

As noted above, Pearson does not disclose, or suggest, all of the elements of the Applicant's amended claims for which it has been asserted. As neither Lindgren, nor Morishima nor Malah, remedy the deficiency discussed above, Applicant respectfully submits that a *prima facie* case of obviousness has not been presented.

Accordingly, Applicant respectfully requests that the rejection of Claims 3, 10 13, and 20 under 35 U.S.C. §103 be withdrawn.

The outstanding Official Action has rejected Claims 10 and 20 under 35 U.S.C. §103 as being unpatentable over Morishima in view of Lindgren, in view of Pearson, and further in view of Malah. The Official Action states that Morishima discloses all of the Applicant's claim limitations with the exception of generating musical notes by digitally sampling a frequency distribution, altering the pitch of a sound waveform, or utilizing 8 kHz as a sampling rate. The Official Action cites Lindgren, Pearson, and Malah as describing these more detailed aspects of the Applicant's invention, and states that it would have been obvious

to one skilled in the art at the time the invention was made to combine the cited references for arriving at the Applicant's claims. Applicant respectfully traverses the rejection.

As noted above, Pearson does not disclose, or suggest, all of the elements of the Applicant's amended claims for which it has been asserted. As neither Lindgren, nor Morishima nor Dunlap, remedy the deficiency discussed above, Applicant respectfully submits that a *prima facie* case of obviousness has not been presented.

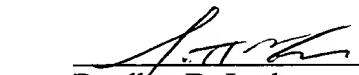
Accordingly, Applicant respectfully requests that the rejection of Claims 10 and 20 under 35 U.S.C. §103 be withdrawn.

CONCLUSION

Consequently, in view of the foregoing amendment and remarks, it is respectfully submitted that the present Application, including Claims 1-5, 7-15, and 17-20, is patently distinguished over the prior art, in condition for allowance, and such action is respectfully requested at an early date.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



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